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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/627,336

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Michael X. Yang

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EXAMINER

ZHENG, LOIS L

ART UNIT

PAPER NUMBER

1742

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/27/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/627,336

Applicant(s)

YANG ET AL.

Examiner

Lois Zheng

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1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>11/22/06, 12/14/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. Claims 1, 10-11 and 18 are amended in view of the amendments filed 7 November 2006. Therefore, claims 1-25 are currently under examination.

Status of Previous Rejections

2. The declarations under 37 CFR 1.132 filed 7 November 2006 is sufficient to overcome the rejection of claims 1-25 based upon Yang et al. US 2004/0016647 A1.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Kovarsky et al US Patent Application Publication 2004/0026255 A1(Kovarsky).

Kovarsky teaches an electroplating cell comprising a fluid basin(Fig. 1 # 101), an ionic membrane separating an anode compartment and a cathode compartment (Fig. 1 # 108 and 110), an anode member coupled, with a membrane support, located in the anode compartment(Fig. 5 # 506, page 5 paragraph [0042]) on the lower portion of the fluid basin. Kovarsky further teaches that the ionic membrane may be a NAFION® membrane based on poly tetrafluoroethylene or a Neosepta® membrane which includes

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CMX-SB ionic membrane based on a polydivinylbenzol matrix(page 3 paragraph [0021]).

Kovarsky further teaches a porous ceramic disk shaped diffusion member between the ionic membrane and a substrate plating position(Fig.1 # 128, page 3 paragraph [0023]).

Regarding instant claims 1-25, Kovarsky's electrochemical plating apparatus meets all the limitations of the instant invention. In addition, Kovarsky further teaches the claimed membranes that are capable of transmitting about 95% to about 98% metal ions(pages 3, paragraph 24). Furthermore, even though Yang does not explicitly teach the claimed current density, the claimed membrane conductivity, the claimed water transfer rate, the ionic membrane of Kovarsky would have inherently been capable of having the claimed membrane conductivity at claimed current density and having the claimed water transfer rate as claimed since Kovarsky teaches an ionic membrane made of the same material as the ionic membrane of the instant invention.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-9, 11-19 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh et al. US 6,251,251 B1(Uzoh) in view of Copping.

Uzoh teaches an electrochemical plating apparatus comprising a fluid basin(Fig. 1), an anode filter separating the fluid basin into an anode compartment and a cathode compartment(Fig. 1 #15, A and C), an anode located on the lower portion of the anode

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compartment(Fig. 1 # 3), a porous diffuser with uniform thickness(Fig. 1 # 11 col. 3 lines 6-9). Uzoh further teaches a filter support frame having a membrane engaging surface with a plurality of channels, slots or bores(Fig. 15 #118).

However, Uzoh does not explicitly teach the anode filter is an ionic membrane comprising a poly tetrafluoroethylene based ionomer.

Copping teaches an electrochemical apparatus comprising a fluid basin with an anolyte and a catholyte solution compartments separated by an ionic membrane(Fig. 1 numerals 12, 30, 32 and 28 respectively). Copping further teaches that the ion exchange membrane is a perfluorinated ion exchange polymer reinforced with polytetrafluoroethylene, such as NAFION[®] from Dupont(col. 2 line 50-67).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the NAFION[®] ionic membrane of Copping as the polymeric membrane for the anode enclosure of Uzoh in order to control amount of metal ions produced from the anode from migrating to the cathode compartment and to prevent other contaminants such as anions and nonpolar species from entering the cathode compartment as taught by Copping(col. 2 lines 50-67).

Regarding instant claims 1-9, 11-18 and 21-23, the filter support frame as taught by Uzoh reads on the claimed membrane support. The anode filter having a NAFION[®] ion exchange membrane as taught by Uzoh in view of Copping inherently meets the limitations of instant claims 2-9 as evidenced by applicant's admitted prior art as recited in paragraph 21 on page 9 of the instant specification. In addition, the ionic membrane anode filter of Uzoh in view of Copping is inherently capable of transmitting the claimed

amount of metal ions at claimed current densities, having claimed conductivity at claimed current densities and having claimed water transfer rate as recited in instant claims 5-9, 14-17 and 21-23 since the ionic membrane anode filter of Uzoh in view of Copping is made of the same material as the material used in the ionic membrane of the instant invention. Therefore, the ionic membrane of Uzoh in view of Copping reads on the cationic membrane comprising a fluorized polymer matrix as claimed.

Regarding claims 19, 24-25, the diffuser as taught by Uzoh in view of Copping is positioned in the catholyte compartment between the cationic membrane and a substrate plating position as claimed.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh in view of Copping and further in view of Genders et al US Patent Application Publication 2002/0189950 A1(Genders) and applicant's admitted prior art.

The teachings of Uzoh in view of Copping are discussed in paragraph 6 above. However, Uzoh in view of Copping do not explicitly teach the ionic membrane anode filter comprising claimed polydivinylbenzol matrix.

Genders teaches a multi-compartment electrodialysis cell comprising cationic membrane such as CMX-SB(page 2 paragraph 21).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the CMX-SB cationic membrane of Genders as the ionic membrane anode filter in the electrochemical plating apparatus of Uzoh in view of Copping since Gender teaches that cationic membranes such as CMX-SB are stable and have a low resistance in a multivalent metal salt solution(page 2 paragraph 21). In addition, since

applicant admits in paragraph 23 of the instant specification that CMX-SB ionic membranes are based on a polyfiviniibenzol matrix, the CMX-SB cationic membrane of Uzoh in view of Copping and Gender meets the limitation of instant claim 10.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh in view of Copping and further in view of Hey et al US Patent Application Publication 2002/0011415 A1(Hey) .

The teachings of Uzoh in view of Copping are discussed in paragraph 6 above. However, Uzoh does not explicitly teach that its diffuser is a ceramic disk.

Hey teaches an electrochemical plating apparatus comprising a fluid basin(Fig. 2 numeral 230), an anode compartment(Fig. 2 numeral 292), a cathode compartment(Fig. 2 numeral 272), an anode located on the lower portion of the anode compartment(Fig. 2 numeral 296), an anode enclosure made of polymeric membranes(Fig. 2 numeral 294, page 3 paragraph 36) and a porous ceramic disk shaped diffuser(Fig. 2 numeral 276, page 3 paragraph 35).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated a ceramic diffuser as taught by Hey in the porous diffuser plate of Uzoh in view of Copping with expected success since Hey teaches that a ceramic porous diffuser plating is suitable for controlling electrolyte flow pattern in a metal electroplating apparatus.

Response to Arguments

9. Applicant's arguments with respect to claims 1-25 filed 7 November 2006 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LLZ

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER